

The Examiner's objections to the specification are acknowledged. Applicant respectfully notes that the specification as filed (at page 11 lines 8 -13, referring to FIG. 13) recites: "Outer peripheral surface portion 140 and, correspondingly opening 150, may have any of various forms of right circular cylindrical, elliptical cylindrical, pyramidal, conical, or splined forms, for example, as alternatives to a form such as that shown in FIG. 13. Any suitable shape of outer peripheral surface portion 140 of hub 10 is formed with a suitable powder metallurgy mold or die." The specification is amended hereinabove to correct the deficiencies noted by the examiner and to provide proper antecedent basis for features of the claims. Basis for corrections to both specification and drawings is found in the claims as filed and in the specification as filed (at page 8 lines 6 and 9 - 14, and at page 11 lines 8 - 13). No new matter is added.

The Examiner's objections to the drawings are acknowledged. Sketches showing proposed amendments to the drawings (marked "DRAFT") are submitted herewith for the Examiner's substantive review, with changes marked in red ink. New formal drawings correcting deficiencies noted by the Examiner will be submitted separately if the proposed drawing amendments are acceptable to the Examiner and if any claims are allowed.

Rejections under 35 USC §112

Claims 1 - 33 stand rejected for indefiniteness under 35 USC §112, second paragraph. Applicant respectfully submits that any indefiniteness in claim 4 cannot make claim 1 unclear, since claim 4 is dependent from claim 1, not vice versa. Nevertheless, claims 1, 4, 17, and 21 are amended hereinabove to more clearly state and distinctly claim what the applicant believes to be his invention. Basis for the limitations inserted into claims 1 and 21 is found in the specification as filed (at page 5 lines 13 - 22 and page 7 lines 4 - 19), and in the drawings, FIGS. 1 and 3 - 9 as filed. Basis for the limitations inserted into claim 4 is found in the specification as filed (at page 8 lines 9 - 14). Basis for the limitations inserted into claim 17 is found in the specification as filed (at page 8 lines 6 - 7). No new matter is added. Applicant respectfully requests that the rejections under 35 USC §112 be withdrawn.

Rejections under 35 USC §102

Claims 1 - 3, 6 - 8, 11 - 16, 21 - 23, and 26 stand rejected under 35 USC §102 as anticipated by Johnson et al., U.S. Pat. No. 4,525,094. The rejection is respectfully traversed. Firstly, applicant's hub is not a split flanged bushing as taught by Johnson et al. Johnson et al. teaches insertion/removal of the bushing into/out of a hub (not shown) (col. 3 lines 26 - 47, col. 4 lines 23 - 31 and 41 - 58, and col. 4 line 59 through col. 5 line 5). Thus the Johnson et al. reference itself distinguishes their bushing from a hub. Johnson et al. also teaches contraction of the bushing around a shaft (not shown), the contraction being made possible by Johnson's longitudinal and radial slot **26** provided in the barrel and in the flange of the bushing (col. 3 lines 17 - 21). Applicant's hub has no need for a slotted bushing with such a slot.

① arguing
Feat. not claimed

Secondly, and more importantly, claim 1 as amended recites in pertinent part "c) an integral stop extending across at least a portion of one of said first and second ends of said first opening, for preventing said shaft from extending beyond said hub when said hub is disposed on said shaft." This is an explicit limitation of claim 1. The Examiner states that Johnson et al. has an integral stop (FIG. 1). However, there is no integral stop in Johnson's FIG. 1 (or anywhere in the teaching of Johnson et al.), for preventing a shaft from extending beyond Johnson's bushing when the bushing is disposed on a shaft. Johnson's key **30** does extend into center bore **28**, but does not extend across any portion of either end of center bore **28**. A shaft in Johnson's center bore **28** would not be prevented from extending beyond Johnson's bushing by any structural element taught by Johnson et al. Thus, there is nothing in Johnson et al. corresponding to applicant's integral stop, and claim 1 is clearly distinguished from Johnson et al. The same remarks apply to independent claim 21 as amended, which has the same integral stop limitation.

②

Regarding claim 3, which recites "a second opening extending through said integral stop, said second opening communicating with said first opening," and its dependent claims 4 - 13, Johnson et al. also teaches no second opening extending through an integral stop.

Regarding claim 7, which recites "wherein said second opening has a round shape and said second opening is disposed concentrically with said first opening," applicant respectfully

A

submits that Johnson et al. has no second opening concentric with center bore 28. The only openings in Johnson et al. that have a round shape are threaded bores 32 and holes 34. Even the center bore 28 in Johnson et al. is not round; cf. Johnson et al. (FIGS. 1, 2, 3, and especially FIG. 6, col. 4 lines 3 - 13 and 38 - 41, and col. 5 lines 6 - 11), describing the shape of center bore 28 with its fillets 40.

Regarding claim 8, which recites "wherein at least a portion of said second opening has a pie shape and the pie-shaped portion of said second opening is disposed concentrically with said integral key," applicant respectfully submits that Johnson et al. has no such pie-shaped second opening. In particular, applicant respectfully submits that fillets 40 in Johnson et al. (FIGS. 3 and 6) do not constitute a pie-shaped second opening.

Thus, claims 1 - 3, 6 - 8, 11 - 13, 21 - 23, and 26 have been clearly distinguished from Johnson et al., U.S. Pat. No. 4,525,094. Applicant respectfully requests that the rejection of these claims under 35 USC §102 be withdrawn and the claims allowed.

Regarding claims 14 - 16, applicant is claiming the product, not the process *per se*. Applicant respectfully submits that, even though product-by process claims may be limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production (MPEP §2113). Claims 14 - 16 are product claims, in which the product is defined by claim 1, and these dependent claims merely add further limitations related to the process of making the product. Thus, in accordance with MPEP §2113 and §608.01(n), if claim 1 is allowable, then claims 14 - 16 are also allowable. Allowance of claims 14 - 16 is therefore also respectfully requested.

Rejections under 35 USC §103

Claims 4, 9, 10, 17 - 20, 24, 25, 27 - 30, and 31 - 33 stand rejected under 35 USC §103 as being unpatentable over specific references as detailed below. Each rejection is considered in turn. However, since all of the rejections under 35 USC §103 cite Johnson et al., it should be pointed out that the differences between Johnson et al. and the present invention as claimed, as

described above in the section on §102 rejections, are also applicable to the rejections under 35 USC §103. Therefore, the Examiner is respectfully requested to consider those differences again with respect to the §103 rejections of claims 4, 9, 10, 17 - 20, 24, 25, 27 - 30, and 31 - 33.

Claim 4 stands rejected under 35 USC §103 as being unpatentable over Johnson et al. The Examiner states that it would have been obvious to modify Johnson to include a shaft having a tapped hole in the end as a form of retaining means to keep the shaft from sliding out of the hub. The rejection is respectfully traversed. First, the Johnson reference itself does not suggest or even hint at the combination or modification or any motivation for the modification. Furthermore, Johnson's bushing, if modified by addition of a shaft having a tapped hole, would not function as the invention of applicant's claim 4, because (as pointed out hereinabove), there is no integral stop in Johnson's bushing for preventing the shaft from extending beyond the hub. More importantly, claim 4 as amended recites in pertinent part "whereby said second opening provides access to said tapped hole in said shaft end by said bolt for fastening said hub to said shaft." Applicant respectfully submits that Johnson et al. has no second opening corresponding to this limitation of claim 4 for providing access to a tapped hole. Therefore the modification of Johnson et al. postulated by the Examiner would not make the invention defined by claim 4 as amended. Therefore, applicant respectfully submits that the Examiner has not shown a *prima facie* case of obviousness of claim 4 in view of Johnson et al. Withdrawal of this rejection of claim 4 is therefore respectfully requested.

Claims 9 and 10 stand rejected under 35 USC §103 as being unpatentable over Johnson et al. in view of Schultz, U.S. Pat. No. 2,738,681. This rejection is respectfully traversed. First, neither the Johnson nor Schultz references themselves suggest or even hint at the combination postulated by the Examiner or any motivation for such a combination. Schultz teaches features that prevent relative rotation of two pulley sections of a step pulley and/or prevent the pulley(s) from rotating independently from a hub, but teaches nothing to prevent his hub from rotating on a shaft, nor any stop for preventing a shaft from extending beyond a hub when the hub is disposed on the shaft.

Second, no combination of the Johnson et al. and Schultz teachings would make the invention of claims 9 and 10. Claim 9 recites "A hub... wherein said integral stop extends across only a portion of one of said first and second ends of said first opening, said integral stop being bounded by a chord extending across said one of said first and second ends of said first opening, said second opening having a segment shape bounded by said chord." Johnson et al. teach a split bushing for disposition on a shaft, clamping onto the shaft by contraction of the split bushing (col. 3 lines 17 - 21) and insertion of the split bushing into a hub (col. 3 lines 26 - 43). Schultz teaches a sheave or pulley 10 having an integral hub 12. Thus Schultz' element 36 (FIG. 3), identified by the Examiner as a chord bounding an "integral stop," is variously described by Schultz as (1) a reversely bent edge flange of pulley section 32 (col. 2 lines 17 - 19), and as (2) a flat on [the outer surface of] hub 12 (col. 2 lines 23 - 25). While neither of these descriptions of Schultz relates to applicant's claims 9 and 10, the latter description seems more consistent with the rest of Schultz' teachings. If we assume that the second description in Schultz of element 36 as a flat is the correct one, the purpose of flat 36 is precluding relative rotation of hub 12 with respect to sheet metal section 22. Schultz recites (col. 2 lines 20 - 25): "The central hole of the sheet metal section 22 is substantially D-shaped in configuration and fits over the reduced end portion 14 of the hub 12, the hub 12 being provided with a flat 36 and thus being complementary in configuration to the central hole in the sheet metal section 22 to preclude relative rotation." Similarly, Schultz recites (col. 2 lines 51 - 54): "... a reinforcing washer 70 (see also Fig. 6) having a substantially D-shaped center hole 72 likewise fits over the reduced end section 16." Thus, applicant respectfully submits that neither Schultz' flat 36, reinforcing washer 70, nor any other teaching of the Schultz reference, is related to the second opening nor to the chord bounding the integral stop of claims 9 and 10. Therefore, applicant respectfully submits that the Examiner has not shown a *prima facie* case of obviousness of claims 9 and 10 in view of Johnson et al. and Schultz. Withdrawal of this rejection of claims 9 and 10 is therefore respectfully requested.



Claim 17 stands rejected under 35 USC §103 as being unpatentable over Johnson et al. in view of Conyngham, U.S. Pat. No. 1,391,719. Applicant acknowledges the Examiner's observation that Conyngham teaches the use of set screws. However, the remarks above relating to the teachings of Johnson et al. are also relevant to claim 17, and the rejection is therefore respectfully traversed.

Conyngham recites in pertinent part (col. 2 lines 79 - 91): "As a means for preventing the translational movement of the member **B** with respect to the member **C**, the overlying portion **16** of one section and the projection **14** of the other section, are preferably provided with tapped holes **17** adapted to receive a setscrew **18** for securely locking said sections. Since the tapped hole **17** extends entirely through the hub section **13** it can be clearly seen ... that the set screw **18** also serves as a means of securely keying the gear wheel **D** to the drive or driven shaft **A**." Thus Conyngham's set screws serve the dual purposes of holding the two mating sections **B** and **C** of Conyngham's sectional gear-wheel together and preventing relative translational movement between them, while also keying the sectional gear-wheel to the shaft **A**. Applicant's keying of hub to shaft, in contrast, is achieved by the keyway and integral key of applicant's claim 1. Applicant does not have two overlapping sections of a sectional gear-wheel to connect with the setscrew. Thus, Conyngham's use of a set screw is quite different from applicant's. Nevertheless, claim 17 is amended hereinabove to more clearly state and distinctly claim what the applicant believes to be his invention. Basis for the limitations inserted into claim 17 is found in the specification as filed (at page 8 lines 6 - 7). The clause "whereby said hub is prevented from moving axially relative to said shaft" is an inherent feature of the structure claimed. Claim 17 as amended is believed to be non-obvious over Johnson et al. in view of Conyngham, and therefore patentable.

Claims 18 - 20 stand rejected under 35 USC §103 as being unpatentable over Johnson et al. in view of Malone, U.S. Pat. No. 5,720,685. The rejection is respectfully traversed. Malone recites (abstract): "A plastic pulley and stub shaft integrally formed with one another and used as a unitary component ..." Such a unitary structure has no need of a split bushing as in Johnson et

al. or a separate hub as in the present invention. Neither of the references themselves suggest the combination, nor even hint at a motivation for combining the teachings. According to the teaching of Johnson et al. (col. 3 lines 26 - 47), a combination of Johnson et al. with Malone would have Johnson's split bushing inserted into Malone's hub, and thus would not make the invention as claimed in claims 18 - 20. Furthermore, claims 18 - 20, being dependent upon claim 1, incorporate all its limitations, including the integral stop, which is not taught by either Johnson et al. or Malone. Therefore, applicant respectfully submits that claims 18 - 20 would not be obvious in view of Johnson et al. and Malone. Withdrawal of this rejection of claims 18 - 20 is therefore respectfully requested.

Claim 24 stands rejected under 35 USC §103 as being unpatentable over Johnson et al. The rejection is respectfully traversed. Claim 24 recites: "A hub as recited in claim 23, said one or more flat surfaces together forming a first opening having a generally polygonal cross-section." Its parent claim 23 recites: "A hub as recited in claim 21, said means integral with said inner surface comprising one or more flat surfaces." The Examiner states that it would have been obvious to one of ordinary skill in the art to modify the "hub taught in Johnson" (sic) to have a generally polygonal cross-section in order to accommodate a non-circular shaft. If this rejection is based on facts within the personal knowledge of the Examiner, an affidavit under 37 CFR 1.104(d)(2) is respectfully requested. Applicant respectfully submits that the "hub taught in Johnson" is a separate article (not illustrated) into which Johnson's split bushing may be inserted. (See, e.g., Johnson et al., col. 3 lines 26 - 47, col. 4 lines 23 - 31 and 41 - 58, and col. 4 line 59 through col. 5 line 5.) Modification of that hub as described by the Examiner would not accommodate a non-circular shaft, but could accommodate a non-circular split bushing. If it is the split bushing of Johnson et al. that may be obviously modified in the manner described by the Examiner, applicant respectfully submits that such a modified split bushing is not necessarily functional, depending upon what surfaces make contact first when such a modified split bushing is contracted (Johnson et al. col. 3 lines 17 - 21) around a non-circular shaft. Again, claim 24, being dependent upon claim 21, incorporates all its limitations, including the integral stop, which



is not taught or suggested by Johnson et al. Thus, applicant respectfully submits that claim 24 would not be obvious in view of Johnson et al. Withdrawal of this rejection of claim 24 under 35 USC §103 is therefore respectfully requested.

Claim 25 stands rejected under 35 USC §103 as being unpatentable over Johnson et al. in view of Gilman, U.S. Pat. No. 3,722,929. The rejection is respectfully traversed. Neither Johnson et al. nor Gilman suggests any combination making the invention defined by claim 25. Claim 25 recites: "A hub as recited in claim 21, said means *integral with said inner surface* comprising one or more splines" (emphasis added). Gilman recites (col. 2 lines 1 - 3): "In Fig. 1 hub 1 has an essentially cylindrical portion 2. This is provided with a central hole 3 for attachment to a shaft of a whole apparatus (not shown)." Thus, Gilman shows a hub 1 (Fig. 1) provided with a central hole 3 for attachment to a shaft. The inner surface of Gilman's central hole 3 has no features corresponding to the splines of claim 25. There is no teaching in Gilman regarding means for fixing, securing, or keying hub 1 to a shaft, or locating hub 1 axially in relation to a shaft. If there were any combination consistent with the teachings of both Johnson et al. and Gilman, it would have Johnson's split bushing inserted into central hole 3 of Gilman's hub 1 (cf.. Johnson et al., col. 3 lines 26 - 47). Furthermore, the teachings of Gilman regarding choice of materials for achieving resilience of projections 4 (col. 2 lines 57 through col. 3 line 9) and regarding disposition of projections 4 at the outer circumference of hub portion 2 (Fig. 1) are both also teaching against applicant's structure defined in claim 25. Again, claim 25, being dependent upon claim 21, incorporates all its limitations, including the integral stop, which is not taught or suggested by either Johnson et al. or Gilman. Thus, applicant respectfully submits that claim 25 would not be obvious in view of Johnson et al. and Gilman. Withdrawal of this rejection of claim 25 under 35 USC §103 is therefore respectfully requested.

Claims 27 - 30 stand rejected under 35 USC §103 as being unpatentable over Johnson et al. The rejection is respectfully traversed. Each of claims 27 - 30 recites, in pertinent part: "A hub as recited in claim 21, said hub having an *outer peripheral surface portion* concentric with said first opening ..." (emphasis added) and continues by reciting a limitation on the form of the

outer peripheral surface portion. Since the engaged shaft is disposed inside the first opening of the hub, none of these claims deals with preventing the engaged shaft from turning as characterized by the Examiner. There is no teaching anywhere in Johnson et al. (or in any of the other references of record) that would hint at or suggest the combination of claims 27 - 30, including the limitations of its parent claim 21 as amended. Therefore, applicant respectfully requests that this rejection of claims 27 - 30 under 35 USC §103 be withdrawn.

Claims 31 - 33 stand rejected under 35 USC §103 as being unpatentable over Johnson et al. in view of Westlake, U.S. Pat. No. 4,043,214. The rejection is respectfully traversed. There is no teaching anywhere in Johnson et al. or Westlake that would suggest the combination of claims 31 - 33, including the limitations of their parent claim 1 as amended. While Westlake teaches a sprocket, gear, or pulley assembly having a hub 12, an annular member 14 which may include gear teeth, and a cap 16, Westlake's construction is very different from the gear structure of claims 31 - 33. Claim 31 recites: "A gear comprising: a) a hub as recited in claim 1, and b) a disk-shaped body having a rim formed with gear teeth, said disk-shaped body being affixed to said hub." Westlake recites (col. 1 lines 52 - 53): "Annular member 14 is sectioned to provide a pair of segments 36." Thus, Westlake's element 14 is not merely disk-shaped, but annular, and consists of a pair of segments 36. The disk-shaped body of claims 31 - 33 does not have segments like those of Westlake. Westlake's method of construction utilizing cap 16 (col. 1 line 54 through col. 2 line 3) and removable segments 36 (col. 2 lines 10 - 17) teaches against the welding and/or pressing limitations of claims 32 and 33. Thus, as in the discussions hereinabove of claims 18 - 20, a combination of Johnson et al. and Westlake teachings would not make the structure claimed in claims 31 - 33, but would have Johnson's split bushing inserted into Westlake's hub 12. Claims 31 - 33, being dependent upon claim 1, incorporate all its limitations, including the integral stop, which is not taught or suggested by either Johnson et al. or Westlake. Thus, claims 31 - 33 would not have been obvious in view of Johnson et al. and Westlake. Therefore, applicant respectfully requests that this rejection of claims 31 - 33 under 35 USC §103 be withdrawn.

Applicant has reviewed the other art cited, and believes that none of the references of record is as pertinent to patentability as the references discussed herein.

This response is believed to be fully responsive to each issue raised in the office action, but if the Examiner maintains any rejection, applicant would appreciate a more detailed explanation of precisely where in the references the combination is suggested or the pertinent limitation disclosed.

Applicant believes that the claims as amended are patentable over the prior art and respectfully requests that the rejections be withdrawn and the claims allowed.

Respectfully submitted,



Theodore R. Touw

Registration No. 36,702

Theodore R. Touw
4 Forest Lane
Westford, Vermont 05494
Telephone: (802) 879-9512
Facsimile: (802) 879-1795